



Inventions, Engineering & Design for Kids

Activity pack featuring famous kid inventors and
engineering prompts for young creators

Sumita Mukherjee



Inventions, Engineering & Design for Kids

Activity pack featuring famous kid inventors and
engineering prompts for young creators

Written by:
Sumita Mukherjee



Table of Contents

● Getting Started!	4
● Introduction – How Do People Invent Things?	5
● The Engineering Design Process Worksheet	6
● The Glowing Paper: Becky Schroeder’s invention of Paper that Glows in the Dark! ○Your turn: invent something that GLOWS ○Plan: Sketch your idea	7
● Oxygen Production Car: Param Jaggi’s invention of a Device that Cleans Car Exhaust! ○Your turn: design a machine that can CLEAN ○Plan: Sketch your idea	10
● Cow Poop Freshener: Nailul Izzah and Rintya Aprianti Miki’s invention of Air Fresheners! ○Your turn: create something useful from WASTE ○Plan: Sketch your idea	13
● Healthy Popsicle: Frank Epperson’s invention of Frozen Food on a Stick! ○Your turn: create a new SNACK ○Plan: Sketch your idea	16
● Windsurfing Mystery: Peter Chilvers’s invention of the First Surfboard with a Sail! ○Your turn: make a water to air FLYING machine! ○Plan: Sketch your idea	19
● Travel Adventure Books!	22



Getting Started

I am absolutely thrilled that you picked this book.

I hope that this book will inspire you to be creative, inquisitive and inventive. It has stories about real kids who became inventors, some by accident and some by hard work. If they could do it, then you know you can too! You'll read about awesome kid creators from all over the world. Let their success encourage you to invent your own cool things. I've included lots of guidance and prompt to show you how.

PRINT IT: The "Invention, Engineering & Design for Kids" book can be printed in order to do the activities easily.

DECORATE THE ROOM: You can pin it near the place you do your homework. You'll find the Engineering Design Process template on page 6; it can be your reference for trying out your inventions.

TRY THE ACTIVITY: Use the stories of the kid inventors and try out your own creation using the design prompts or invent something unique of your choice.

There are lots of experiments for you to try which will also help you become a great inventor. Some of them require you ask for your parent or an adult's help. There are all so fun to do with your friends, neighbors' and siblings.

I can't wait to hear about what you create! I would love to see photos of your inventions and invite you to share them on Facebook:

https://www.facebook.com/WizkidsClub-1533263083602143/?ref=aymt_homepage_panel

Go ahead and access the inventions from the WIZKIDS CLUB!

Let's explore and invent together!

Introduction- How Do People Invent Things?

People from every corner of the world, of different ages, with different levels of education invent by finding out problems, using creative ideas, and developing new solutions. Inventors' and engineers' initial ideas rarely solve a problem. Instead, they try different ideas, learn from mistakes, and try again. There are a series of steps they use to arrive at a solution and it is called the Engineering Design Process. As you work through your invention process, use the guide below to understand the invention process and tie it to specific steps of the Engineering design process.

Five steps that can help you create a new invention

ASK:

- What are some different ways to tackle today's problem? Brainstorm ideas.
- How creative can we be? Off-the-wall suggestions often spark GREAT ideas!

IMAGINE:

- Which brainstormed ideas are really possible given our time, tools, and materials?
Choose the idea that seems to work the best.

PLAN:

- Design and sketch out your idea.
- What materials will you need to build your invention?
- Come up with the step-by-step process in order to build it.

CREATE:

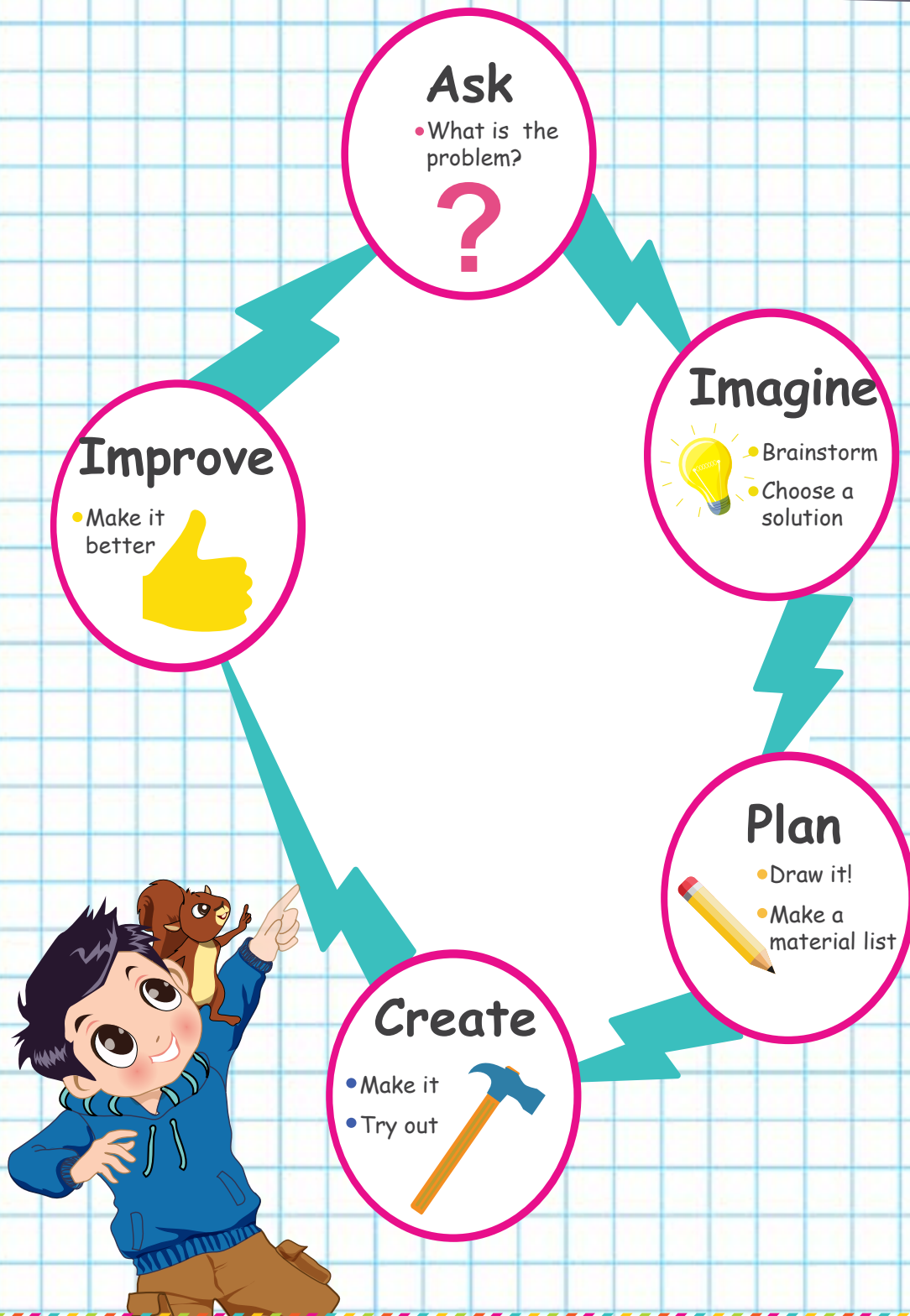
- Build it using the plan and the materials. Test it out and see what works and what doesn't.

IMPROVE:

- What do you think is the best feature of your invention? Why?
- If you had more time, how could you improve your invention?

Both inventors and engineers look for ways to improve things in areas like health, food, safety, transportation, aerospace, electronics, communication, and the environment. How about you try your own?

Engineering Design Process



GLOWING PAPER



Introducing Becky Schroeder- The Inventor of Paper that Glows in the Dark!

Do you ever wish that you could make doing homework easier? Becky Schroeder didn't just wish this; she invented a tool to make it happen at the age of 12!

In 1974, when Becky was 10 years old, she was trying to do her math homework in her mom's car. Soon it got dark outside and she couldn't see the paper. She didn't have a flashlight nor did she want to turn on the car's light, as it would light up the entire car. She asked herself "Why not light up the paper instead?"

She took out her glow-in-the-dark Frisbee and thought, "what makes it glow?" She wrote down some ideas and did some research. She found out that the manufacturers used a substance called "PHOSPHORUS" to make things glow in the dark. Next day her parents took her to buy the paint. Soon she experimented with phosphorescence paint, spreading it over to cover an acrylic board. She created this board that glowed so she could write on it even when you were in a dark room. With further experiments and modifications, she finally developed her invention and named it "The Glow-Sheet".

Two years later at the young age of 12, Becky became the youngest women to be granted patent in the United States for her Glo-Sheet invention.

Phosphorous: It is a chemical that glows in the dark and in moist air.



YOUR TURN: Invent something that glows!

Use the Engineering Design Prompt to come up with an invention of your own.

ASK

What glowing thing can you make, that will solve a problem or make it better?

IMAGINE

Use your imagination to think of some solutions. Brainstorm ideas and choose the best option.

PLAN

Sketch your idea. Use the next page to make the design. Make a list of the things you will require.

CREATE

Using the materials, follow your plan and create it.

IMPROVE

What worked? What didn't? Modify your creation to make it even better.

PLAN: Sketch your idea here!

I created a glow-in-the-dark jellyfish for my room at night. The secret ingredient was glow-in the dark acrylic paint!



OXYGEN PRODUCING CAR



Introducing Param Jaggi- Inventor of A Device that Cleans Car Exhaust!

While other teenagers in the United States were just learning how to drive, Param Jaggi at 15 came up with an idea to reduce pollution coming from a car and keep the air clean.

In 2008, Param was at a stop sign, when he saw smoke coming out of the car in front. Through further investigation, he found out that the polluting agent was "carbon dioxide". An idea struck him and he wondered, "Why not create a device that cleans the smoke coming out of cars?"

Param started working on a solution and designed the "Algae Mobile". This device needs to be inserted into the tailpipe of a car. Through photosynthesis, algae inside the device convert carbon dioxide into oxygen and release it into the air.

Param applied for a patent in 2009 and has been continuously improving his design. In May 2011, he received the U.S Environmental Protection Agency's award. With a cost of only about \$30 per unit, there's a good chance we will one day have an Algae Mobile on our cars.

Carbon Dioxide: It is a gas, which is released into the air when car engines burn fuel. It isn't usually harmful unless there is too much in the air.

Photosynthesis: It is the process by which plants make their own food using sunlight, water and carbon dioxide from air.

Oxygen: It is also given out by plants after photosynthesis has taken place.



YOUR TURN: Design a machine that can clean!

Use the Engineering Design Prompt to come up with invention of your own.

ASK

What cleaning thing can you make, that will solve a problem or make it better?

IMAGINE

Use your imagination to think of some solutions. Brainstorm ideas and choose the best option.

PLAN

Sketch your idea. Use the next page to make the design. Make a list of the things you will require.

CREATE

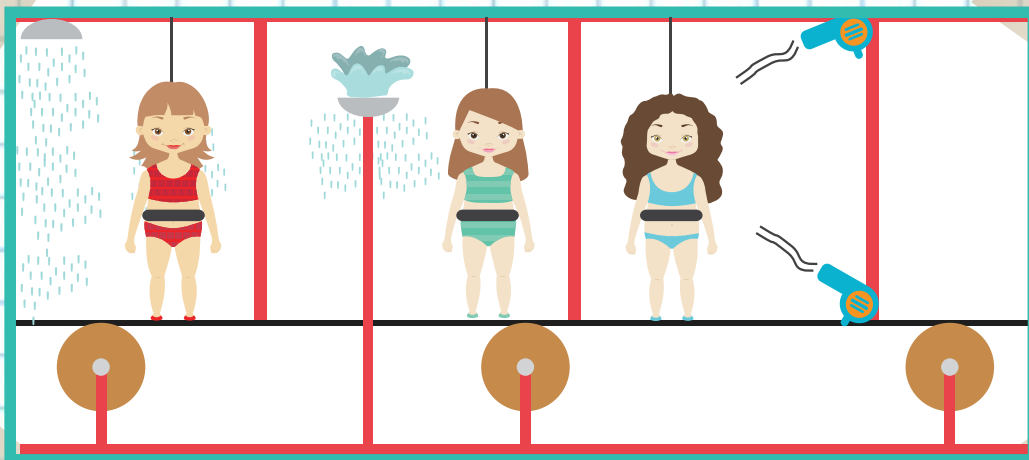
Using the materials, follow your plan and create it.

IMPROVE

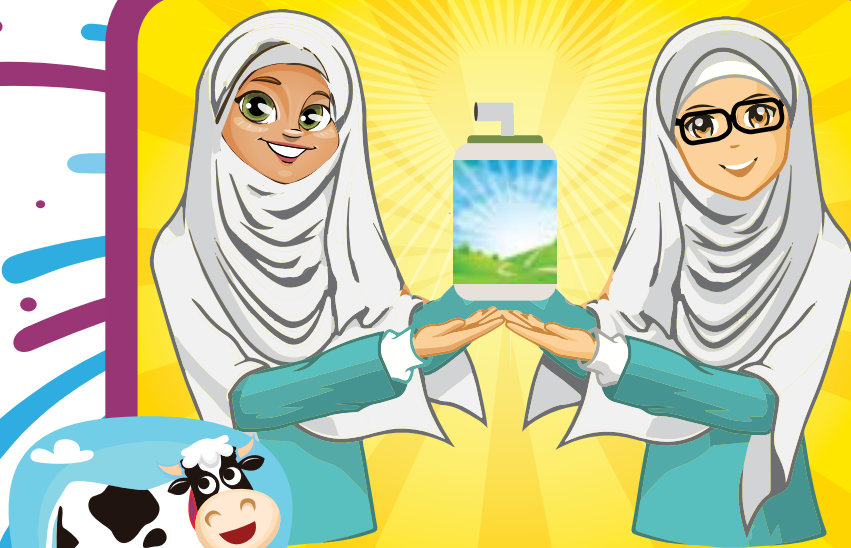
What worked? What didn't? Modify your creation to make it even better.

PLAN: Sketch your idea here!

What do you think of a washing zone for people?



COW POOP FRESHNER!



Introducing Dwi Nailul Izzah and Rintya Aprianti Miki- Inventors of Air Freshener!

Who would think making air freshener using cow manure? The answer is two high school students from Indonesia! In 2013, these girls impressed judges at the National Science Project Olympiad with their ingenious air freshener made from cow dung. Believe it or not, the organic produce actually has a pleasant plant-like fragrance.

Dwi Nailul Izzah and Rintya Aprianti Miki collected the necessary material from a cattle farm in East Java, and let it ferment for three days. Then they extracted the water from the fermented manure and mixed it with coconut water. Finally, they distilled the liquid to eliminate all impurities. The whole process took 7 days, which is pretty long, but in the end they obtained what they were looking for - a liquid air freshener with an herbal aroma from digested cow food. They said that their air freshener did not contain chemicals to smell fragrant and it was pure. They had removed all the harmful materials from the dung; also the chemicals that made it smell bad. This made the air freshener better than most air fresheners as many of them include chemicals, which are known to make people sick.

Manure: It is the term used to refer to the dropping of some plant-eating animals. Their droppings consist of large amount of partially digested plant material broken down into small fragments.

Ferment: It is the process in which a substance breaks down into a simpler substance




YOUR TURN: Create something useful from waste.

Use the Engineering Design Prompt to come up with invention of your own.


ASK

What useful thing can you make from waste, that will solve a problem or make it better?




IMAGINE

Use your imagination to think of some solutions. Brainstorm ideas and choose the best option.



PLAN

Sketch your idea. Use the next page to make the design. Make a list of the things you will require.



CREATE

Using the materials, follow your plan and create it.



IMPROVE

What worked? What didn't? Modify your creation to make it even better.

PLAN: Sketch your idea here!

I am working on my plastic bottle



HEALTHY POPSICLE



Introducing Frank Epperson- Inventor of Frozen Food on a Stick.

Sometimes inventions happen by accident: Frank Epperson will agree to that! In 1905, one winter's night, 11-year-old Frank left a powder flavoured soda water concoction with a stirring stick out on the porch overnight. Of course, the next morning the mixture had frozen solid. When he pulled it, out came the stick with the tasty soda.

Many years later in 1922, when he was 28, he gave out his frozen treat at a fireman's ball. Everyone loved them and it was a huge hit. He patented his idea and called it an "Epsicle Ice Pop." Later he changed the name to "Popsicle."

In 1925, Frank sold the rights to NY's Joe Lowe Company. That's when the Popsicle sales really took off as it gained popularity. Later the frozen treats were improvised as the twin Popsicle, Fudgsicle, Creamsicle, Dreamsicle and many more.

Concoction: It is to make a food or drink, by mixing different things together.





YOUR TURN: Create a new snack

Use the Engineering Design Prompt to come up with an invention of your own.


ASK

What snack can you make from any food that already exists?



IMAGINE

Use your imagination to think of some solutions. Brainstorm ideas and choose the best option.



PLAN

Sketch your idea. Use the next page to make the design. Make a list of the things you will require.



CREATE

Using the materials, follow your plan and create it.



IMPROVE

What worked? What didn't? Modify your creation to make it even better.

PLAN: Sketch your idea here!

Nothing like the fruit pop!
How about veg-soup pops?
Do you want to try mine?



WINDSURFING MYSTERY



Introducing Peter Chilvers- Inventor of the first surfboard with a sail!

In 1958, 12-year-old Peter Chilvers created the very first sailboard.

As a young boy on Hayling Island, located on the southern coast of Britain, Chilvers enjoyed a variety of water sports. He was very fond of water surfing and one day he thought "I wonder what would happen if I put a sail on my surfboard?"

He decided to build his first windsurf with plywood and put a sail on it. This became the first sailboard and soon a sport. It was a remarkable achievement being one of the youngest inventors we know of.

Later on, he grew up to be a part of the Lotus Car Manufacturing Company that produced some of the fastest racing cars in the United Kingdom.

Peter is also involved in building a windsurfing and sailing center on Hayling Island to remember the place where Windsurfing was invented and where he grew up.

Surfboard: A long, narrow board that is used for surfing

Water surfing: The activity or sport of riding ocean waves on a special board called surfboard.




YOUR TURN: Make a water to air flying machine!

Use the Engineering Design Prompt to come up with an invention of your own.


ASK

What flying machine can you make, that can travel from water to sky?




IMAGINE

Use your imagination to think of some solutions. Brainstorm ideas and choose the best option.



PLAN

Sketch your idea. Use the next page to make the design. Make a list of the things you will require.



CREATE

Using the materials, follow your plan and create it.



IMPROVE

What worked? What didn't? Modify your creation to make it even better.

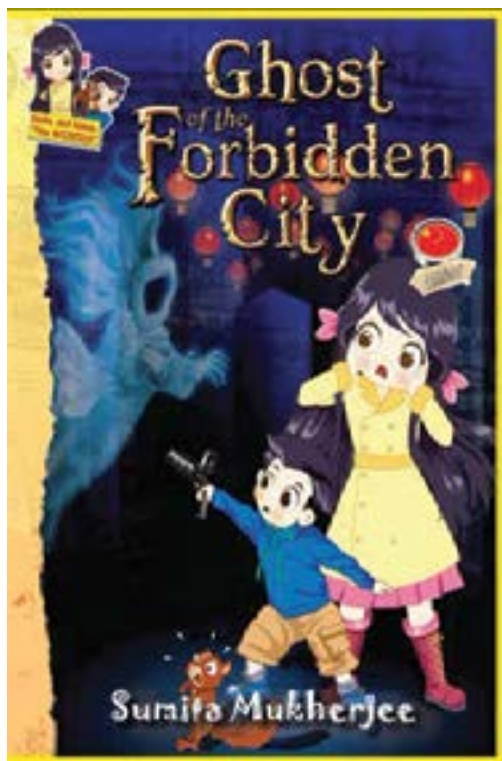
PLAN: Sketch your idea here!

I made this costume inspired by the flying fish. Now I can shoot out of the water and fly straight to the sky!



Other books from the WIZKIDS CLUB you might like :

Travel Adventure Series!



Keiko, Kenzo and Eji are in the bustling city of Singapore to attend their cousin sister, Kiara's recital on Ancient Sea Trade. Keiko and Kiara discover a hidden note in an ancient urn, leading them into an ancient treasure hunt. Soon they realize evil treasure hunters are out to get them. Find out what happens in this race that takes place under the South China Sea.

The book highlights the attractions of the city of Singapore. Facts on Maritime Silk Road, Singapore Flyer, Ancient Trade and famous shipwrecks in the world have been woven into the story so readers get a true sense of Singapore as they travel with our heroes in a dangerous undersea race for buried treasure.

BUY NOW:

<http://wizkids.club/sunken-treasure-hunt/>

Keiko, Kenzo and Eji are on their way to China with their school friends and a strict teacher. They visit the Forbidden palace and discover that it is haunted. Strange things happen in the guesthouse. When they investigate, they are shocked to see an unearthly hollow face! Kenzo, being a brave heart, finds a clue and decides to get to the bottom of the mystery.

The book also offers insights and information on culture, history and geographic sites including the Great Wall of China, The Forbidden Palace, Zodiacs and Wonders of the World. It is a thrilling adventure book woven with real world facts to make learning absolutely enjoyable. Science and technology has been fused into the story to inspire kids to explore and invent.

BUY NOW:

<http://wizkids.club/ghost-of-the-forbidden-city/>





Copyright © 2016 Sumita Mukherjee. All rights reserved.
No part of this book may be distributed, reproduced, stored in retrieval system or transmitted in any form or by any means, electronic, mechanical, recording or otherwise, without written permission from the copyright holder. For information regarding permission, please contact info@wizkids.club,

 info@wizkids.club

 www.wizkids.club

Author : Sumita Mukherjee

Illustrator : Dzynpro

First Edition : November 2016, Canada

All rights reserved. No part of this book may be distributed, reproduced, stored in retrieval system or transmitted in any form or by any means, electronic, mechanical, recording or otherwise, without written permission from the copyright holder. For information regarding permission, please contact info@wizkids.club.